



US009409306B2

(12) **United States Patent**  
**Middleton et al.**

(10) **Patent No.:** **US 9,409,306 B2**  
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **DYNAMICALLY DIRECTED WORKPIECE POSITIONING SYSTEM**

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(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/814,223**

(22) Filed: **Jul. 30, 2015**

(65) **Prior Publication Data**

US 2016/0031110 A1 Feb. 4, 2016

**Related U.S. Application Data**

(60) Provisional application No. 62/031,639, filed on Jul.  
31, 2014.

(51) **Int. Cl.**

**B26D 5/00** (2006.01)

**B26D 7/01** (2006.01)

**B26D 7/06** (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **B26D 5/007** (2013.01); **B26D 7/01** (2013.01);  
**B26D 7/0625** (2013.01); **B26D 7/2628**  
(2013.01); **G05B 19/402** (2013.01); **G05B**  
**2219/50148** (2013.01)

(58) **Field of Classification Search**

CPC ..... **B25B 5/08**; **B25B 1/08**; **B23Q 3/108**;  
**B23Q 1/0063**

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,615,093 A 10/1986 Tews et al.  
5,689,942 A \* 11/1997 Suga ..... B65B 9/067  
53/374.6

5,768,759 A 6/1998 Hudson

(Continued)

**FOREIGN PATENT DOCUMENTS**

CA 27232310 A1 3/2009  
EP 0916447 A2 5/1999

**OTHER PUBLICATIONS**

PCT Application No. PCT/US2015/042979 International Search  
Report and Written Opinion mailed Oct. 28, 2015, 22 pages.

(Continued)

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**ABSTRACT**

In various embodiments, a dynamically directed workpiece positioning system may include a transport, a sensor positioned to detect a workpiece on the transport, a cutting member positioned along or downstream of the transport, and a computer system. The sensor may scan the workpiece as the workpiece is moved relative to the transport by a human operator or a positioning device. Based on the scan data, the computer system may generate commands to guide the human operator or positioning device in moving the workpiece to a desired position corresponding to a cut solution for the workpiece. Optionally, the computer system may cause the cutting member to be repositioned while the workpiece is being moved relative to the transport. Once the workpiece is in the desired position, the transport may be used to move the workpiece toward the cutting member. Corresponding methods and apparatuses are also disclosed.

**36 Claims, 21 Drawing Sheets**

